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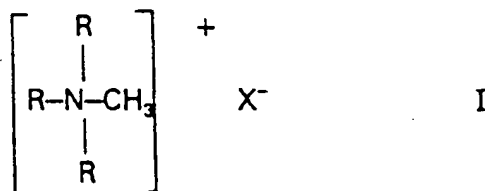
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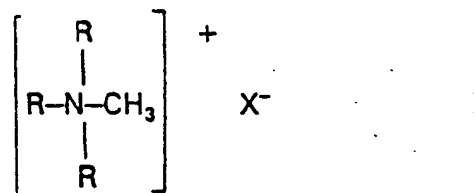
### (54) Paint stripper compositions

(57) A paint-stripper composition is described which comprises a mixture of water and at least one organic solvent selected from (A-1) alkoxy benzenes or alkoxy naphthalenes or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2). A method of stripping paint from a surface also is described, and the method comprises

(I) contacting the paint with a paint-stripping composition comprising a mixture of at least about 3% by weight of water and at least one organic solvent selected from (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2); and

(II) removing said paint and paint stripper composition from said surface.

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## Description

[0001] This invention relates to paint strippers and to methods of stripping paint from surfaces. More particularly, the invention relates to pseudoplastic paint strippers with improved rheological properties.

[0002] The terms "paint stripper" and "paint remover" as used in this application refer to chemical compositions which can strip or facilitate stripping of coatings such as paint which are used to protect and beautify substrates. With the introduction of new and more durable types of synthetic resins and polymers in protective and decorative coatings, the problem of stripping the coating has become increasingly difficult. Prior art paint removers and strippers typically contain blends of aromatic solvents, ketones, paraffin, methanol and diluents, for example, mineral spirits. Traditional paint strippers have contained hazardous materials such as phenol, toluene and methylethyl ketone, and the most effective paint strippers were based on methylene chloride as the primary solvent. Methylene chloride is a very effective solvent, and paint strippers containing methylene chloride are effective for quickly softening most types of paints. Methylene chloride, however, is a highly volatile liquid thereby shortening the work life. In addition, methylene chloride has been discovered to cause tumors and cancer in animals in laboratory tests and, accordingly, attempts are being made in the industry and by governmental regulatory agencies to eliminate or greatly reduce its use.

[0003] A number of paint removers and paint strippers have been introduced in recent years which avoid the use of methylene chloride and flammable, volatile and toxic chemicals such as benzene, toluene, phenol, and acetone. N-methyl-2-pyrrolidone (NMP) has been employed in place of methylene chloride as a solvent ingredient in paint-stripper compositions as suggested in several patents. U.S. Pat. No. 4,759,510, for example, describes a paint-stripper having a low volatility which includes about 20% to 90% by weight of NMP and 30% to 70% by weight of an aromatic hydrocarbon solvent. U.S. Pat. No. 4,836,950 describes liquid formulations for removing screen printing inks which comprises a mixture of NMP and gamma-butyrolactone.

[0004] U.S. Pat. No. 5,124,062 describes paint-stripper compositions having high flash points and low-boiling volatile organic chemicals which comprise a mixture of a terpene compound containing at least 10 carbon atoms, NMP and a terpene emulsifying surfactant.

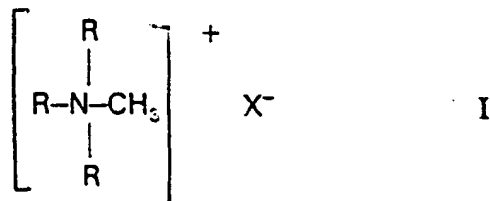
[0005] U.S. Patent 3,322,677 describes paint stripping compositions consisting essentially of ethylenediamine and anisole, and optionally 2 to 3 percent by volume of a 40° Baume solution of sodium silicate diluted with four parts of water. The paint-stripping compositions are particularly useful with paint on non-ferrous metals such as aluminum and magnesium.

[0006] Murphy U.S. Patent 3,615,827 describes alkaline paint-stripping compositions containing an alkylene glycol aryl ether such as ethylene glycol morophenyl ether which is used in combination with a polyalkylene glycol such as tripropylene glycol. U.S. Patent 4,477,288 recites a cleaning solution containing a phenyl glycol ether and a heterocyclic amine such as imidazole.

[0007] Recently, non-hazardous products for removing paint have been introduced which incorporate the use of benzyl alcohol as a principal solvent. The performance of benzyl alcohol-based strippers is improved when activated with an acid, but such stripping agents may deleteriously affect high strength steel which is used, for example, in aircraft landing gear parts. Benzyl alcohol-based strippers also have been available which contain an alkaline component rather than an acid for activation. Benzyl alcohol containing paint-stripping compositions are disclosed in U.S. Patents 5,454,985 and 4,732,695. U.S. Patent 5,411,678 (Sims) describes paint strippers comprising an organic solvent such as a benzyl alcohol, pyrrole, at least one other organic amine compound as an activator, and water. EP Patent 497,130 B1 describes paint-stripper formulations containing a solvent system comprising an ester of a benzyl or methyl benzyl alcohol. In particular, the formulations comprise benzyl alcohol/benzyl formate/formic acid.

[0008] Paint-strippers and paint removers are utilized in the aerospace industry for removing paints from commercial and military jet aircraft. Periodic paint removal is required for aesthetic reasons, for a change of colors, or more importantly, for inspection of the air frame as required for safe operation of an aircraft.

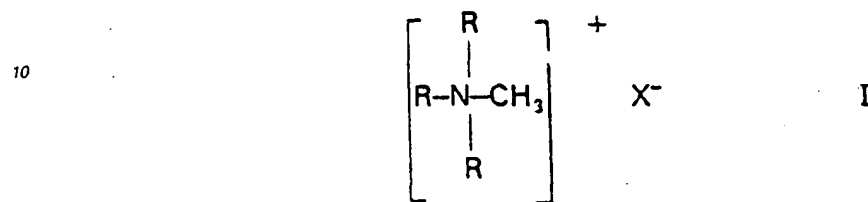
[0009] A paint-stripper composition is described which comprises a mixture of water and at least one organic solvent selected from (A-1) alkoxy benzenes or alkoxy naphthalenes or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X

is a halogen, or (A-3) a mixture of (A-1) and (A-2). A method of stripping paint from a surface also is described, and the method comprises

- (I) contacting the paint with a paint-stripping composition comprising a mixture of at least about 3% by weight of water and at least one organic solvent selected from (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) at least one quaternary amine salt of the formula

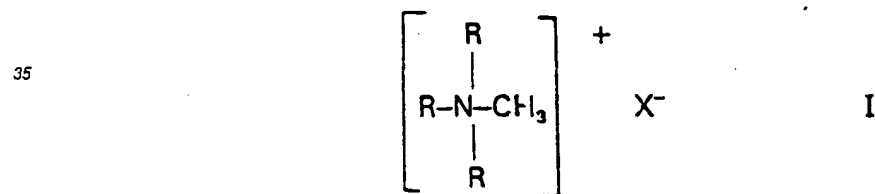


wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen, or (A-3) a mixture of (A-1) and (A-2); and

- (II) removing said paint and paint stripper composition from said surface.

[0010] As noted, the paint stripper compositions of the present invention comprise a mixture of water and at least one organic solvent selected from alkoxy benzenes and alkoxy naphthalenes, a quaternary amine salt of formula I, or a mixture thereof. Water is an essential component of the paint stripper compositions, and generally, the compositions will contain at least about 3% by weight up to about 99% by weight of water. In preferred embodiments, the aqueous compositions will contain at least about 5%, 10%, or 20% by weight of water and in some instances at least 25% to 40% by weight of water. The amount of water present in the compositions may be as high as 99% by weight, but is more often as high as 95%, 90%, or 80% by weight. Suitable ranges of water concentration in the compositions of the invention include from 3% to about 99% by weight, from about 5% to about 95% by weight, and 10% to about 95% by weight.

[0011] A second essential component of the paint stripper compositions of the present invention is (A) at least one organic solvent of the group of either (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) quaternary amine salts of the formula

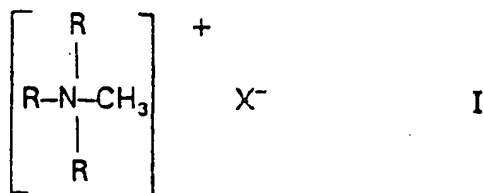


wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen, or (A-3) a mixture of (A-1) and (A-2). Components (A-1) or (A-2) are organic solvents which may be present in the aqueous paint stripping compositions in varying amounts. Generally, the organic solvent (A) will be present in an amount of at least about 0.1 % by weight. In a preferred embodiment, the paint stripping composition will contain at least about 1 % and more often at least about 5% by weight of the organic solvent (A). The paint stripping compositions of the invention will contain up to about 15%, or 20%, or 50%, or 70%, or 80%, or even 90% by weight or more of component (A). Ranges of from 0.1 % to about 50%, from about 1% to about 50%, and from about 5% to about 50% of organic solvent (A) are typical ranges.

[0012] In one preferred embodiment, solvent (A) is at least one alkoxy benzene or alkoxy naphthalene. The alkoxy groups may contain from 1 to about 4 or 5 carbon atoms, and preferably contain 1 or 2 carbon atoms. The alkoxy benzenes and naphthalenes may contain other groups such as hydroxy groups attached to the benzene or naphthalene rings. Examples of alkoxy benzenes which may be utilized in the compositions of the present invention include methoxy benzene (anisole), ethoxy benzene (phenetole), 4-methyl-ethoxy benzene, 1-phenoxy-2-propanol, 3-methyl anisole, 4-methyl anisole, 2-methoxy phenol, 2-ethoxy phenol, 4-methoxy phenol, 4-ethoxy phenol, 2,4-dimethyl anisole, 2,5-dimethyl anisole and 2-ethoxy anisole. Examples of alkoxy naphthalenes include 1-methoxynaphthalene, 2-methoxynaphthalene, 1-ethoxynaphthalene and 2-ethoxynaphthalene.

[0013] The quaternary amine salt (A-2) which may be utilized in the aqueous paint-stripping compositions of the

present invention is generally characterized by the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen.

[0014] In another embodiment, each R of Formula I is independently an aliphatic group composed primarily of C<sub>8</sub> and C<sub>10</sub> chain links, and the halogen is chlorine. An example of a commercially available quaternary amine salt which is useful in the present invention is Adogen 464 from Sherex Chemical Company, Inc., Dublin, Ohio. Adogen 464 is reportedly a methyl trialkyl quaternary amine wherein each R is composed primarily of C<sub>8</sub> and C<sub>10</sub> chain links, and X is chlorine.

[0015] When component (A) in the paint stripping compositions of the invention is at least one quaternary amine salt of Formula I, the paint stripping compositions also preferably contain from about 0.1 to about 10% by weight and more often from about 0.1 % to about 5% by weight of at least one aliphatic oxime containing at least 2 carbon atoms. Examples of such aliphatic oximes include acetaldehyde oxime, acetone oxime, butanone oxime, methylethylketoxime, diethylketoxime, etc.

[0016] As noted earlier the first organic solvent may comprise a mixture of an alkoxy benzene or alkoxy naphthalene and a quaternary amine salt of Formula I. The relative amount, on a weight basis, of (A-1) to (A-2) in the mixture may range from 1:99 to 99:1.

[0017] A second organic solvent which may be present in the paint-stripper compositions of the present invention is (B) at least one organic solvent which is selected from the group consisting of benzyl alcohol, alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl-substituted furfuryl alcohol and acetylenic alcohols containing from 3 to about 5 carbon atoms. The amount of this second organic solvent (B) incorporated into the paint-stripper compositions of the present invention is at least about 5% by weight. Generally, the compositions will contain at least about 5% or 10% or even 15% by weight and up to about 90% or more by weight of the second organic solvent. In other instances the paint stripper compositions may contain up to 80% or 50% or even 40% of the second organic solvent. Thus, for example, the concentration of the second organic solvent (B) in the paint stripper compositions may range from 5% to 90%, 10% to 80%, 10% to 50% or 15% to 40% by weight.

[0018] Any of the alkyl-substituted benzyl alcohols may be utilized, and the alkyl groups generally contain from 1 to about 4 carbon atoms. Specific examples of the alkyl-substituted benzyl alcohols include: alpha-methylbenzyl alcohol, alpha-ethylbenzyl alcohol, ortho-methylbenzyl alcohol, meta-methylbenzyl alcohol, para-methylbenzyl alcohol, ortho-ethylbenzyl alcohol, para-ethylbenzyl alcohol, para-propylbenzyl alcohol, para-n-butylbenzyl alcohol and para-t-butylbenzyl alcohol.

[0019] The alkyl group in the alkyl-substituted furfuryl alcohols may contain from 1 to 4 carbon atoms. Examples of substituted furfuryl alcohols include alpha-methylfurfuryl alcohol, alpha-ethylfurfuryl alcohol, 5-methylfurfuryl alcohol, etc.

[0020] The acetylenic alcohols which may be utilized as the organic solvent in these paint-stripper compositions of the present invention contain from about 3 to about 5 carbon atoms, and the acetylenic alcohols may be primary or secondary alcohols. Primary alcohols are preferred. Examples of acetylenic alcohols which may be used in the present invention include propargyl alcohol, 2-butyne-1-ol, 3-butyne-1-ol, 3-butyne-2-ol, 1-pentyne-3-ol, 2-pentyne-1-ol, 3-pentyne-1-ol, 4-pentyne-1-ol.

[0021] In one preferred embodiment, the second organic solvent utilized in the present invention is one containing a primary hydroxyl group, that is, a —CH<sub>2</sub>OH group. That is, in a preferred embodiment of the invention the organic solvents are selected from a group consisting of benzyl alcohol, ring-substituted alkylbenzyl alcohols, furfuryl alcohol, furfuryl alcohols which contain an alkyl substituent on the ring, and those acetylenic alcohols wherein the hydroxyl group is on a terminal methylene group such as propargyl alcohol, 2-butyne-1-ol, 3-butyne-1-ol, 2-pentyne-1-ol, 3-pentyne-1-ol and 4-pentyne-1-ol.

[0022] In one preferred embodiment, the paint-stripping compositions of the present invention also contain a pyrrole. The amount of the pyrrole contained in the paint stripping compositions may vary over a wide range, but generally, the concentration of the pyrrole will be from about 0.1 to about 50% by weight or more. In one embodiment, the paint stripping composition contains from about 0.1 to about 20% by weight of a pyrrole. The pyrrole acts as a cosolvent and an

activator in the paint stripping compositions.

[0023] The paint-stripping compositions of the present invention also may contain at least one inorganic clay thickener. A variety of inorganic clay thickeners including modified natural clays are available and useful in the paint-stripping compositions of the present invention. Examples of inorganic clays which can be utilized either in their natural form or in modified form include smectite clays, montmorillonite clays, hectorite clays, bentonite clays, etc. Smectite clays are particularly useful in the paint-stripping compositions of the present invention. Colloidal or hydrated magnesium aluminum silicate is an example of a specific type of treated smectite clay which is useful in the present invention. Such colloidal or hydrated magnesium aluminum silicates are available commercially from, for example, R.T. Vanderbilt Co., Inc. under the trade designations Veegum and Van Gel. Magnesium aluminum silicate also is available from Rheox, Inc. under the trade designation Bentone MA. Montmorillonite clay thickeners also are available commercially. For example, organically modified montmorillonite clays are available from Rheox, Inc. under the general trade designations Baragel 3000, Bentone SD, Bentone 27, Bentone 34, Bentone 760, Bentone 2282, etc. Hectorite clays are available commercially from, for example, Southern Clay Products under the general trade designation Laponite, and from Rheox, Inc. under the designation Bentone LT. Bentonite clays are available from American Colloid Company under the general trade designation Polargel.

[0024] The amount of inorganic clay thickener utilized in the paint-stripping compositions of the present invention generally will be in the range of from about 0.05 to about 5% by weight. More often, the amount of the inorganic clay thickener present in the paint-stripping composition will be in the range of from about 0.1 to about 1.5% by weight based on the total weight of the paint-stripping composition.

[0025] The paint-stripping compositions of the present invention also contain one or more organic thickeners which, when combined with the inorganic clay thickener, provide paint-stripping compositions of the present invention with unique rheological properties. The organic thickeners may be polysaccharides, synthetic thickening polymers, or mixtures of two or more of these. Polysaccharide gums are high molecular weight molecules, usually with colloidal properties, which, in an appropriate solvent or swelling agent, produce gels or highly viscous suspensions or solutions at low gum concentrations. Among the polysaccharide gums that are useful are natural gums such as those disclosed in Industrial Gums, Polysaccharides And Their Derivatives, R.L. Whistler and J.N. BeMiller, editors, third edition, Academic Press Inc (1995). The disclosures in this book relating to water-soluble polysaccharide gums is hereby incorporated by reference. Specific examples of such polysaccharide gums include gum agar, guar gum, gum arabic, algin, dextran, xanthan gum, methyl cellulose and its derivatives, hydroxyalkyl and alkyl ethers of cellulose, etc. Polysaccharides produced by microorganisms are particularly useful polysaccharides, and xanthan is a particularly preferred example of a polysaccharide gum useful in the paint-stripping compositions of the present invention. An example of commercially available xanthan gums which are useful in the compositions of the invention include Rodopol 23 and Rhodigel from R.T. Vanderbilt Co. Inc.; and Keltrol, Keltrol BT, Keltrol RD, Keltrol SF, Kelzan, Kelzan D35, Kelzan S, etc. available from the Kelco Division of Merk & Co. Inc.

[0026] Xanthan gum is a particularly preferred polysaccharide gum thickener which may be used either alone or in combination with other thickeners such as cellulose ethers and esters, including alkyl celluloses such as methyl cellulose and hydroxyalkyl celluloses such as hydroxyethyl cellulose, hydroxypropyl cellulose, etc. Examples of commercial cellulosic ethers which are useful in the present invention either alone or in combination with other polysaccharides such as xanthan gum include hydroxyethyl cellulose available from Hercules Inc. under the general trade designations Natrosol 250 ER, 250 HB, 250 HR, etc. Methylcellulose products are available commercially under a variety of designations such as Methocel, etc. Ethyl cellulose products also are available commercially such as Ethocel Standard 100 from Dow Chemical Co.

[0027] The organic thickeners which may be utilized in the present invention can also be synthetic thickening polymers. Many such polymers are known to those skilled in the art, and representative examples of synthetic thickening polymers include polyacrylates, polyacrylamides, hydrolyzed vinyl esters, water-soluble homo- and interpolymers of acrylamidoalkane sulfonates, poly N-vinyl pyrrolidones, homo- and copolymers as well as water soluble salts of styrene, maleic anhydride and isobutylene maleic anhydride copolymers. A commercially available organic thickener useful in the present invention is a soybean oil alkanolamide available under the trade designation Mazamide SS10 from PPG Industries. Mazamide 65 (PPG Industries) is an organic thickener which comprises mixed fatty acid diethanol amine. Alcogum L is an acrylic copolymer emulsion available from Alco Chemical Corp., a division of National Starch and Chemical.

[0028] The amount of organic thickener included in the paint-stripping compositions of the present invention may range from about 0.05 to about 5% by weight. More often, the amount of such thickener included in the paint-stripping compositions will be in a range of 0.1 to about 1 or 2% by weight based on the total weight of the paint-stripping composition.

[0029] The relative amounts of the inorganic clay and organic thickener such as polysaccharide gums included in the paint stripping compositions of the invention can be varied and adjusted to provide the particular rheological properties

desired. More particularly, the relative amount of the inorganic clay and the polysaccharide gum present in the paint-stripper composition can be adjusted to provide a composition having the desired pseudoplastic characteristics.

[0030] Other components may be included in the paint-stripping compositions of the present invention to provide additional desired properties. Examples of such optional components include surfactants, activators, alkalinity agents, inhibitors, wetting agents and antioxidants, etc.

[0031] Various surfactants can be incorporated into the paint-stripping compositions to increase the wetting characteristics of the compositions, and the surfactants may be anionic, nonionic, cationic or amphoteric surfactants or mixtures thereof. In one embodiment, the surfactants may be nonionic surfactants such as, for example, acetylenic polyols such as tetrameth-yldecynediol (Surfynol 104 or 104A, Air Products Inc.), aryloxyalkanols such as phenoxyethanol, phenoxyglycol, etc.

[0032] In one preferred embodiment, the surfactants are fluorinated nonionic, cationic or anionic surfactants. Fluorinated nonionic surfactants include fluorinated alkyl polyoxyethylene ethanols, fluorinated alkyl alkoxyates and fluorinated alkyl esters. Examples of fluorinated cationic surfactants include fluorinated alkyl quaternary ammonium halides such as iodides, etc. Useful fluorine-containing surfactants are available commercially from the 3M Company under the general trade designation Fluorad FC and from E.I. DuPont de Nemours under the general trade designation Zonyl FS. Specific examples of such surfactants include Fluorad FC-135 which is a fluorinated alkyl quaternary ammonium iodide, Fluorad FC-170-C which is a fluorinated alkyl polyoxyethylene ethanol, Fluorad FC-171 which is a fluorinated alkyl alkoxyate, and Fluorad FC-430, FC-431 and FC-740 which are fluorinated alkyl esters. Specific examples of fluoro chemical surfactants available from DuPont include Zonyl FSN, Zonyl FSN-90, Zonyl FSO and Zonyl FSO-100 which are nonionic surfactants. In one preferred embodiment, the surfactants utilized in the present invention of the non-ionic fluorinated alkyl alkoxyates. Anionic surfactants also may be included in the paint-stripping compositions. One example of a useful anionic surfactant is Triton DF-20 which is a modified ethoxylate from Union Carbide. An example of a useful amphoteric surfactant is Miranol C2M which is cocoamphocarboxy propionic acid from Rhone-Poulenc, Dayton, N.J. Typically, the surfactants, when present in the paint-stripping compositions of the invention, are utilized in amounts varying from about 0.001 to about 1 or 2% by weight.

[0033] Amine activators may also be included in the paint-stripping compositions of the invention, and such activators include ammonia, ammonium hydroxide or at least one organic amine compound. The amount of the activator present in the paint-stripping compositions may range from about 0% to about 5 or 10% by weight based on the total weight of the paint-stripping composition. In one embodiment, the paint-stripping compositions will contain from about 0.1 to about 1 or 1.5% by weight of ammonia, ammonium hydroxide or an organic amine or mixtures thereof.

[0034] A wide variety of organic amine compounds can be included as activators in the paint-stripper compositions of the invention. In one embodiment, the amines which may be used in the paint-stripper compositions of the present invention include one or more amines from the group of pyrrole, aliphatic amines, cycloaliphatic amines and heterocyclic amines. In another embodiment, the amines are primary aliphatic amines or aliphatic oximes containing at least 2 carbon atoms. In yet another embodiment, the aliphatic amines comprise oxyalkyl amines, hydroxyl amines and/or diamines.

[0035] Examples of aliphatic and cycloaliphatic primary amines useful in the present invention include ethylamine, propylamine, isopropylamine, butylamine, amylamine, furfurylamine and cyclohexylamine. The amines may be secondary amines such as dimethylamine, diethylamine, methylpropylamine, etc., or tertiary amines such as triethylamine.

[0036] Hydroxylamines are also useful in the present invention and specific examples of such amines include: ethanolamine; 3-amino-1-propanol; 2-amino-2-methyl-1-propanol; 2-amino-2-ethyl-1,3-propanediol; tris(hydroxymethyl)-amino methane; N-methyl ethanolamine; 2-diethylamino-2-methyl-1-propanol. Alkoxyated amines (oxyalkylamines) also can be used in the present invention and these may be represented by 2-methoxyethylamine; 3-methoxypropylamine; 2-ethoxyethylamine; 3-ethoxypropylamine; etc.

[0037] Diamines are also useful, and the diamines may contain hydroxy groups. Examples of useful diamines include aliphatic diamines such as ethylenediamine, 1,3-diaminopropane, 1,2-diaminopropane, 1,4-diaminobutane, 1,6-diaminohexane, 3-dimethyl-aminopropylamine, aminoethyl ethanolamine, etc.

[0038] In another embodiment, the amine may be an aliphatic oxime containing at least 2 carbon atoms such as acetaldehyde oxime, acetone oxime, butanone oxime, methylethylketoxime, diethylketoxime, etc. Mixtures of hydroxyamines and oximes are particularly useful when it is desired to reduce corrosion.

[0039] In addition to the aliphatic amines, heterocyclic amines may be utilized. These include, for example, piperazine and its derivatives, piperidine and its derivatives, morpholine and its derivatives, etc. Specific examples of such heterocyclic compound include morpholine, 4-methyl morpholine and N-aminoethyl morpholine; piperazine, 1-methyl piperazine, 2-methylpiperazine and N-aminoethyl piperazine; piperidine, 4-aminomethyl-piperidine, 2-methyl-piperidine, 3-methylpiperidine, 4-methyl-piperidine, etc.

[0040] Alkalinity agents also can be incorporated into the paint-stripping compositions of the present invention in applications to neutralize the acidity contributed by some components such as inhibitors, thickeners, surfactants, etc. Examples of useful alkalinity agents include alkali metal hydroxides such as sodium hydroxide, alkoxides and silicates

such as sodium silicate, sodium methoxide, potassium methoxide, sodium ethoxide, etc. The amount of alkalinity agent included in the paint-stripping compositions of the present invention may range from about 0.01% to about 5% by weight and more often between 0.05% to about 1 or 2% by weight. The amount of alkalinity agent included in any particular paint-stripping composition will depend on the amount of the acid-contributing component(s) present in the composition.

[0041] In lieu of alkalinity agents, the paint stripping compositions of the invention may contain one or more acids to provide an acidic paint stripping composition. Examples of useful acids include organic acids as well as inorganic acids, and specific examples of the organic acids include formic acid, acetic acid, monochloro acetic acid, propionic acid, butyric acid, isobutyric acid, citric acid, lactic acid, adipic acid, succinic acid, hydroxy acetic acid, glycolic acid, mandelic acid, p-toluene sulfonic acid, acrylic acid, etc. Examples of inorganic acids include hydrochloric acid, sulfuric acid, nitric acid, boric acid, hydrofluoric acid, etc. When an acid is present in the paint stripping compositions of the present invention, the acid will be present in an amount up to about 15 or 20% by weight. Thus, the amount of acid present in the paint stripping compositions of the present invention may range from about 0.1 to about 20%, and more often may range from about 1 to about 15% by weight.

[0042] Various inhibitors also can be incorporated into the paint-stripping compositions of the invention, generally, in combination with certain surfactants. Examples of corrosion inhibitors include triazoles such as benzotriazoles, and silicates such as sodium silicate. The benzotriazoles include benzotriazole and substituted benzotriazoles. Examples of suitable compounds are benzotriazole, alkyl-substituted benzotriazole (e.g., tolyltriazole, ethylbenzotriazole, hexylbenzotriazole, octylbenzotriazoles, etc.) aryl-substituted benzotriazole (e.g., phenylbenzotriazoles, etc.), an alkaryl- or arylalk-substituted benzotriazole, and substituted benzotriazoles wherein the substituents may be, for example, hydroxy, mercapto, alkoxy, halo (especially chloro), nitro, carboxy or carbalkoxy. Preferred are benzotriazole, the alkylbenzotriazoles in which the alkyl group contains 1 to about 20 carbon atoms and especially 1 to about 8 carbon atoms, most desirably benzotriazole and tolyltriazole, and carboxy substituted benzotriazole.

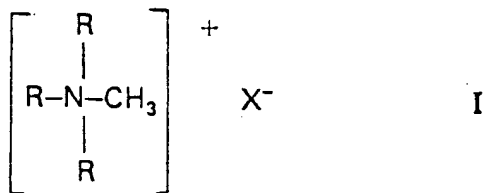
[0043] Ethers of acetylenic diols are also useful corrosion inhibitors which may be included in the paint-stripping compositions of the invention. One example of a useful ether compound comprises a mixture of hydroxyethyl ethers of butynediol available from International Specialty Products under the trade designation Butoxyne 497. A combination of tolyltriazole and mercaptobenzotriazole has been found to be particularly effective in the compositions of the invention. A useful carboxy benzotriazole mixture is available under the designation Cobralec CBT from PMC Specialties Group Inc. of PMC Inc. Benzotriazole and substituted benzotriazoles are available from Ceba-Geigy Corp. under the general trade designation Rheomet. SACI 100A is a modified calcium sulfonate corrosion inhibitor dispersion in oil and mineral spirits available from Witco Petroleum Specialties Group, Witco, Corporation. Only small amounts of the inhibitors are generally needed and such amounts range from about 0.01 to about 3% or 5% by weight.

[0044] Wetting agents also can be included in the paint-stripping compositions. For example, the inclusion of glycerine improves the consistency of the composition and the ability of the paint-stripping composition to wet the paint surface. The amount of wetting agent can range from 0 to about 4 or 5% by weight.

[0045] In one embodiment, the paint-stripping compositions of the present invention containing at least one organic thickener and at least one inorganic thickener are characterized as pseudoplastic, shear thinned compositions with improved rheological properties. The compositions can be prepared having relatively low viscosity while exhibiting desirable thixotropic characteristics. The paint stripper compositions of the invention have a high ability to cling to painted surfaces and penetrate the paint.

[0046] In one preferred embodiment, the paint stripping compositions of the present invention comprise a mixture of

(A) from about 0.1 to about 90% by weight of at least one organic solvent of the group of either (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) quaternary amine salts of the formula wherein each R independently



an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen;

(B) from about 5% to about 90% by weight of at least one organic solvent selected from the group consisting of benzyl alcohol, alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms;

- (C) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;  
 (D) from about 0.05% to about 5% by weight of at least one organic thickener; and  
 (E) up to about 94.8% by weight of water. These paint stripping compositions also may contain from about 0.1 to about 20% by weight of pyrrole, and one or more alkalinity agents or one or more acids. More preferably, component (A) is selected from alkoxy benzenes and alkoxy naphthalenes as described above.

[0047] In another preferred embodiment, the paint stripping compositions of the invention comprise a mixture of

- (A) from about 0.1 to about 90% by weight of at least one alkoxy benzene or alkoxy naphthalene;  
 (B) from about 10% to about 80% by weight of at least one organic solvent selected from the group consisting of benzyl alcohol alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms;  
 (C) from about 0.1 to about 10% by weight of a pyrrole;  
 (D) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;  
 (E) from about 0.05% to about 5% by weight of at least one organic thickener; and  
 (F) up to about 89.7% by weight of water.

[0048] In yet another embodiment, the paint stripping composition of the present invention comprises a mixture of

- (A) from about 1 to about 50% of an alkoxy benzene;  
 (B) from about 10% to 50% by weight of at least one organic solvent selected from the group consisting of benzyl alcohol or an alkyl-substituted benzyl alcohol containing from 1 to about 4 carbon atoms in the alkyl group;  
 (C) from about 1 to about 10% of pyrrole;  
 (D) from about 0.1% to about 1.5% by weight of a hydrated magnesium aluminum silicate mineral;  
 (E) from about 0.1% to about 0.5% by weight of a xanthan gum;  
 (F) from about 0.1% to about 1.0% by weight of a cellulose ether or ester; and  
 (G) up to about 87.7% by weight of water.

[0049] The paint-stripping compositions of the present invention are aqueous emulsions which generally are prepared by blending and mixing a first mixture which is an organic mixture with a second aqueous mixture. For example, a thickener such as Methocell is dispersed in a solvent such as benzyl alcohol, and/or anisole and a clear thick solution is formed. Surfactants, such as Fluorad FC-171 (nonionic) and Triton DF-20 (anionic) may be incorporated into the organic solution. A separate aqueous composition is prepared containing water, the quaternary amine salt, if present, the inorganic clay and the organic thickener (or thickeners) such as xanthan gum either alone or in combination with hydroxyalkyl cellulose along with the optional components such as amine activators, corrosion inhibitors, alkalinity agents, dyes, etc. Preferably the inorganic clay and the organic thickener(s) are codispersed in the aqueous emulsion by forming a mixture of the clay and thickener(s) which is then dispersed in the water or the clay and thickener(s) are simultaneously dispersed in the water. If the clay and thickener(s) are not codispersed in the water but added individually, higher viscosity compositions are obtained. The organic mixture then is added to the aqueous mixture with good agitation to form a creamy emulsion.

[0050] The following examples illustrate the paint-stripper compositions of the present invention which can be prepared as described above by separately preparing Part A and Part B and thereafter blending the two parts together. Unless otherwise indicated in the specification and appended claims, all parts and percentages are by weight, temperatures and degrees centigrade, and pressures are at or near atmospheric pressure.



**Example I****Parts/wt.****Part A**

Anisole	70.0
Benzyl alcohol	10.0

**Part B**

Water	20.0
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**Example II****Part A**

Benzyl alcohol	35.0
Methocell XUS 40443	0.3
Anisole	5.0

**Part B**

Water	57.9
Veegum - T	1.5
Xanthan gum	0.3

**Example III****Part A**

Benzyl alcohol	33.460
Fluorad FC171	0.003
Methocell XUS 40443	0.300
Triton DF-20	0.300
Phenetole	10.000

**Part B**

Water	50.572
Natrosol 250H4 BR	0.342
Veegum T	1.246
Xanthan gum	0.283
Triethanolamine (99%)	0.303
Sodium hydroxide (50%)	0.121
Sodium silicate (E-grade)	1.010
Ammonium hydroxide (28%)	2.021
Dye	0.039

**Example IV**

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**Part A**

Benzyl alcohol	19.45
Pyrrole	1.50
Fluorad FC-171	0.003
Tolyltriazole	0.37
10 Mercaptobenzotriazole	0.16
Methocell XUS 40443	0.23
Triton DF-20	0.32

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**Part B**

Water	62.83
Sodium silicate (E-grade)	3.00
Natrosol 250 H4BR	0.37
20 Xanthan gum	0.28
Veegum T	0.05
Glycerine	2.16
Butoxyne 497	0.33
SACI 100A	0.35
25 Dye	0.01
Sodium hydroxide (50%)	0.25
Anisole	8.34

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**Example V****Part A**

Benzyl alcohol	29.59
35 Pyrrole	1.50
Fluorad FC 171	0.003
Tolyltriazole	0.32
Mercaptobenzotriazole	0.14
40 Methocell XU 540443	0.20
Triton DF-20	0.30

**Part B**

Water	52.64
45 Natrosol 250 H4BR	0.32
Sodium silicate (E-grade)	2.38
Xanthan gum	0.24
Veegum T	0.04
50 Ammonium hydroxide	2.77
Glycerine	1.84
Triethanolamine	0.92

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	Butoxyne 497	0.92
	Rodafac RE-610	0.03
5	SACI 100A	0.25
	Adogen 464 (85%)	3.85
	Acetaldehyde oxime (50%)	1.50
	Sodium hydroxide (50%)	0.25

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**Example VI****Part A**

	Benzyl alcohol	24.50
15	Anisole	4.00
	Ethocel Standard 100	0.10
	Miranol C2M	0.50
	Fluorad FC-171	0.02
20	Acetic acid, glacial	8.59

**Part B**

	Water	61.079
25	Natrosol 250 H4BR	1.00
	Xanthan gum	0.20
	Rhodamine B (dye)	0.000258
	Sodium hydroxide (50%)	0.01

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**Example VII****Part A**

	Benzyl alcohol	29.590
35	Fluorad FC-171	0.003
	Tolyltriazole	0.324
	Mercaptobenzotriazole	0.138
	Methocell XUS 40443	0.200
40	Triton DF-20	0.277

**Part B**

	Water	53.861
	Sodium silicate (E-grade)	1.386
45	Natrosol 250 H4BR	0.320
	Xanthan gum	0.240
	Veegum T	0.046
	Ammonium hydroxide	2.773
50	Glycerine	1.849
	Triethanolamine	0.925
	Butoxyne 497	0.277

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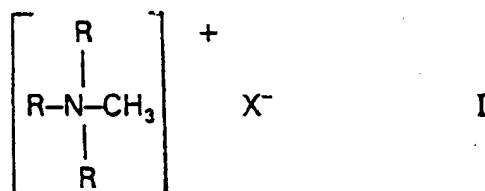
Rodafac RE-610	0.028
Adogen 464 (85%)	3.400
Acetaldehyde oxime (50%)	1.840
Pyrrole	2.300
Sodium hydroxide (50%)	0.200
Dye	0.010

[0051] The process for preparing the paint-stripping compositions is illustrated in more detail with regard to the preparation of the composition of Example IV. A first aqueous mixture (Part A) is prepared by mixing the benzyl alcohol, pyrrole, tolyltriazole, mercaptobenzotriazole, Fluorad FC-171, Methocel XUS 40443 and Triton DF-20 in the amounts indicated above, and a clear thick solution is formed. A separate aqueous solution (Part B) is prepared by simultaneously adding the Natrosol 250 H4BR, Veegum T and Xanthan gum in the amount specified above to the water with stirring to form a codispersion. After mixing for about five minutes, the remaining ingredients of Part B are added individually with stirring for about 5 minutes between the addition of each ingredient. When all of the components of Part B have been dispersed in the water, the organic mixture Part A is then added to the aqueous mixture Part B with good agitation to form a creamy emulsion. The emulsion of Example IV has a viscosity of between about 4,000 to 12,000 centipoise. When formulation similar to Example IV is prepared wherein Natrosol 250, Veegum T and Xanthan gum are added and blended into the water individually, the resulting composition is characterized as having a viscosity in the range of 4,000 to 12,000 centipoise.

[0052] The process of preparing the paint stripping composition of Example VI is illustrated in more detail as follows. An aqueous mixture (Part B) is prepared by mixing all of the ingredients specified in Example IV, and a clear thick solution is formed. A separate solution (Part A) is prepared by mixing 24 parts of the benzyl alcohol, 4 parts of anisole and 0.10 part of Ethocel Standard 100 until the Ethocel is completely dispersed. A premix of 0.5 parts of benzyl alcohol and 0.5 parts of Miranol C is prepared with heating until the Miranol is in solution, and this solution is then added to the above prepared mixture of benzyl alcohol, anisole and Ethocel. The Fluorad FC-171 and the glacial acetic acid are then added to Part A with thorough mixing. Part A is then added to Part B, and mixed until the mixture is smooth and a uniform pink color is obtained.

[0053] The present invention also relates to a method of stripping paint from a surface which comprises

(I) contacting the paint with a paint-stripping composition comprising a mixture of at least about 3% by weight of water and at least one organic solvent (A) selected from (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2); and

(II) removing said paint and paint stripper composition from said surface.

More often, the present invention relates to a method of stripping paint from a surface which comprises

(I) contacting the paint with a paint stripper composition

which comprises (A) from about 0.1 to about 90% by weight of at least one alkoxy benzene or alkoxy naphthalene containing from 1 to about 4 carbon atoms in the alkoxy groups;

(B) from about 10% to about 80% by weight of at least one organic solvent selected from the group consisting of benzyl alcohol alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acet-

yleneic alcohols containing from 3 to about 5 carbon atoms:

(C) from about 0.1 to about 10% by weight of a pyrrole;

(D) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;

(E) from about 0.05% to about 5% by weight of at least one organic thickener; and

(F) up to about 89.7% by weight of water; and

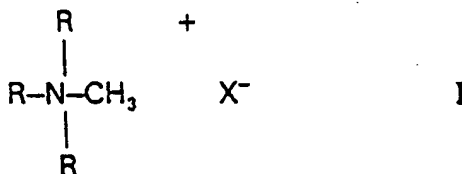
(II) removing said paint and paint-stripper from said surface.

[0054] In the method of the invention, the paint to be removed from a surface is contacted with the paint-stripper compositions for a period of time sufficient to reduce the adhesion of the paint to the surface. Contact may be effected by immersion of the painted surface in a container containing the paint stripper, or the paint stripper can be applied to the painted surface by any technique known in the art such as spraying, brushing, rolling, etc. A reduction of the adhesion to the paint to the surface is generally exhibited by bubbling and lifting of the paint from the surface so that the paint can thereafter be easily removed from the surface. The time required to effect the stripping of the paint will vary depending upon a variety of factors including the nature of the paint, the age of the paint, the surface which is painted, etc. Paints which can be stripped with the stripping composition of the present invention include alkyds, acrylics, polyurethanes, epoxies, epoxy/urethane, etc.

[0055] The paint stripping compositions of the invention such as the composition of Example IV containing corrosion inhibitors pass the Sandwich Corrosion, Immersion Corrosion and Hydrogen Embrittlement tests as required, for aerospace applications, such as for example, by McDonnell Douglas (CSD#1) and Boeing (D6-17487. Rev L).

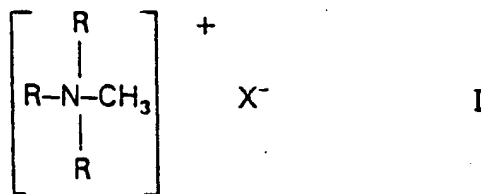
#### Claims

1. An aqueous paint-stripping composition comprising a mixture of at least about 3% weight of water and at least one organic solvent (A) selected from (A-1) alkoxy benzenes or alkoxy naphthalenes or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2)

2. The paint-stripping composition of claim 1 wherein the organic solvent is (B) an alkoxy benzene containing from 1 to about 4 carbon atoms in the alkoxy group.
3. The paint-stripping composition of claim 1 or 2 wherein the organic solvent (A) is anisole.
4. The paint-stripping composition of any of claims 1 to 3 also containing at least one second organic solvent (B) selected from benzyl alcohol, alkyl substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms.
5. The paint-stripping composition of claim 4 wherein the second organic solvent is benzyl alcohol or an alkyl substituted benzyl alcohol.
6. The paint-stripping composition of claim 4 also containing pyrrole.
7. An aqueous paint-stripping composition comprising a mixture of:
  - (A) from about 0.1 to about 90% by weight of a first organic solvent selected from either (A-1) at least one alkoxy benzene or alkoxy naphthalene or (A-2) at least one quaternary amine salt of the formula

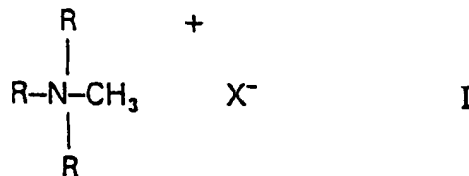


wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2); and

(B) from about 5% to about 90% by weight of at least one second organic solvent selected from benzyl alcohol, alkyl substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms; and

(C) up to about 94.9% by weight of water.

8. The paint-stripping composition of claim 7 also containing from about 0.1 to about 20% by weight of a pyrrole.
9. The paint-stripping composition of claim 7 or 8 wherein (A) is (A-2) and the composition also contains about 0.1 to about 10% by weight of at least one aliphatic oxime containing at least 2 carbon atoms.
10. The paint-stripping composition of claim 7 also containing at least one thickener.
11. The paint-stripping composition of claim 10 wherein the thickener is a mixture of at least one inorganic clay thickener and at least one organic thickener.
12. The paint-stripping composition of claim 7 wherein the first organic solvent (A) is an alkoxy benzene containing from 1 to about 4 carbon atoms in the alkoxy group.
13. A paint-stripping composition comprising a mixture of
  - (A) from about 0.1 to about 90% by weight of at least one organic solvent of the group of either (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) quaternary amine salts of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen;

(B) from about 5% to about 90% by weight of at least one second organic solvent selected from benzyl alcohol, alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms;

(C) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;

(D) from about 0.05% to about 5% by weight of at least one organic thickener; and

(E) up to about 94.8% by weight of water.

14. The paint-stripping composition of claim 13 also containing from about 0.1 to about 20% by weight of pyrrole.
15. The paint-stripping composition of claim 13 or 14 wherein A is (A-2), and the composition also contains from about 0.1 to about 10% by weight of at least one aliphatic oxime containing at least 2 carbon atoms.
16. The paint-stripping composition of any of claims 13 to 15 wherein the organic solvent (B) is benzyl alcohol or an alkyl substituted benzyl alcohol.

17. The paint-stripping composition of claim 13 wherein (A) is A-1, and the alkoxy groups contain from 1 to about 4 carbon atoms.
18. The paint-stripping composition of claim 17 also containing one or more alkalinity agents or one or more acids.
19. A paint-stripping composition comprising a mixture of
- (A) from about 0.1 to about 90% by weight of at least one alkoxy benzene or alkoxy naphthalene containing from 1 to about 2 carbon atoms in the alkoxy groups;
  - (B) from about 10% to about 80% by weight of at least one second organic solvent selected from benzyl alcohol alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms;
  - (C) from about 0.1 to about 10% by weight of a pyrrole;
  - (D) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;
  - (E) from about 0.05% to about 5% by weight of at least one organic thickener; and
  - (F) up to about 89.7% by weight of water.
20. The paint-stripping composition of claim 19, wherein the organic solvent (B) is benzyl alcohol or an alkyl substituted benzyl alcohol.
21. The paint-stripping composition of claim 19, wherein (A) is an alkoxy benzene containing 1 or 2 carbon atoms in the alkoxy group.
22. The paint-stripping composition of claim 19, wherein (A) is anisole.
23. The paint-stripping composition of any of claims 19 to 22 wherein the inorganic clay thickener is selected from the group consisting of smectite clay, montmorillonite clay, hectorite clay, and bentonite clay.
24. The paint-stripping composition of any of claims 19 to 22 wherein the inorganic clay thickener is a smectite clay.
25. The paint-stripping composition of any of claims 19 to 22 wherein the inorganic clay thickener is a hydrated magnesium aluminum silicate mineral.
26. The paint-stripping composition of any of claims 19 to 25 comprising at least one organic thickener (C) which is a polysaccharide gum.
27. The paint-stripping composition of claim 26, wherein the polysaccharide gum is a natural gum or a xanthan gum.
28. The paint-stripping composition of any of claims 19 to 27 also containing at least one surfactant.
29. The paint-stripping composition of any of claims 19 to 28 also containing one or more alkalinity agents.
30. The paint-stripping composition of claim 29 wherein the alkalinity agents comprise alkali metal hydroxides, alkoxides, or silicates, or mixtures thereof.
31. The paint-stripping composition of any of claims 19 to 30 also containing at least one acid.
32. The paint-stripping composition of any of claims 19 to 31 also containing one or more metal corrosion inhibitors.
33. A paint-stripping composition comprising a mixture of
- (A) from about 1 to about 50% of anisole or phenetole;
  - (B) from about 10% to 50% by weight of at least one organic solvent selected from benzyl alcohol or an alkyl-substituted benzyl alcohol containing from 1 to about 4 carbon atoms in the alkyl group;
  - (C) from about 1 to about 10% of pyrrole;
  - (D) from about 0.1% to about 1.5% by weight of a hydrated magnesium aluminum silicate mineral;
  - (E) from about 0.1% to about 0.5% by weight of a xanthan gum;
  - (F) from about 0.1% to about 1.0% by weight of a cellulose ether or ester; and

(G) up to about 87.7% by weight of water.

34. The paint-stripping composition of claim 33 wherein the organic solvent (B) is benzyl alcohol.

5 35. The paint-stripping composition of claim 33 wherein the alkoxy benzene is anisole.

36. The paint-stripping composition of any of claims 33 to 35 wherein the cellulose ether or ester is a cellulose ether selected from alkyl cellulose and hydroxy alkyl cellulose.

10 37. The paint-stripping composition of any of claims 33 to 36 also containing at least one surfactant.

38. The paint-stripping composition of any of claims 33 to 37 also containing one or more alkalinity agents.

15 39. The paint-stripping composition of claim 38 wherein the alkalinity agents comprise alkali metal hydroxides, alkoxides, or silicates, or mixtures thereof.

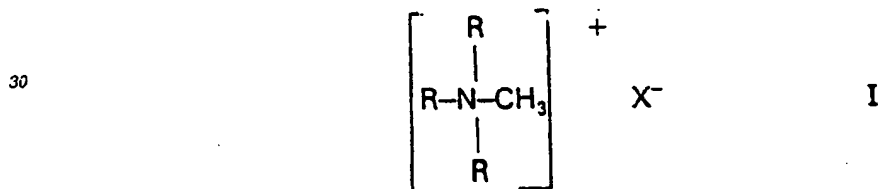
40. The paint-stripping composition of any of claims 33 to 39 also containing at least one acid.

20 41. The paint-stripping composition of claim 40 wherein the acid is an organic acid.

42. The paint-stripping composition of any of claims 33 to 41 also containing at least one metal corrosion inhibitor.

43. A paint-stripping composition comprising a mixture of

25 (A) from about 0.1 to about 50% of weight of at least one quaternary amine salt of the formula



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wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen;

(B) from about 10% to about 80% by weight of at least one organic solvent selected from benzyl alcohol, alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms;

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(C) from about 0.1 to about 20% of weight of pyrrole;

(D) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;

(E) from about 0.05% to about 5% by weight of at least one organic thickener; and

(F) up to about 89.7% by weight of water.

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44. The paint-stripping composition of claim 43 also containing from about 0.1 to about 10% by weight of at least one aliphatic oxime containing at least 2 carbon atoms.

50 45. The paint-stripping composition of claim 43 or 44 wherein the organic solvent (B) is benzyl alcohol or an alkyl substituted benzyl alcohol.

46. The paint-stripping composition of any of claims 43 to 45 wherein in (A), each R contains an average of about 8 to about 10 carbon atoms, and X is chlorine.

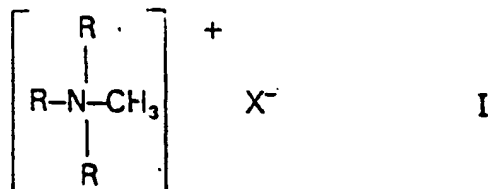
55 47. The paint-stripping composition of any of claims 43 to 46 wherein the inorganic clay thickener is selected from smectite clay, montmorillonite clay, hectorite clay, and bentonite clay.

48. The paint-stripping composition of any of claims 43 to 47 also containing one or more alkalinity agents.



49. A method of stripping paint from a surface which comprises;

(I) contacting the paint with a paint-stripping composition comprising a mixture of at least about 3% by weight of water and (A) at least one organic solvent selected from either (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) at least one quaternary amine salt of the formula



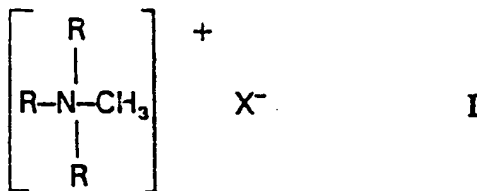
wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2); and

(II) removing said paint and paint stripper composition from said surface.

50. The method of claim 49 wherein the organic solvent is an alkoxy benzene containing from 1 to about 4 carbon atoms in the alkoxy group.

51. A method of stripping paint from a surface which comprises (I) contacting the paint with a paint-stripper composition which comprises

(A) from about 0.1 to about 90% by weight of at least one organic solvent of the group of either (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2);

(B) from about 5% to about 90% by weight of at least one organic solvent selected from benzyl alcohol, alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms; and

(C) up to about 94.9% by weight of water; and

(II) removing said paint and paint-stripper composition from said surface

52. The method of claim 51 wherein the organic solvent (B) is benzyl alcohol.

53. The method of claim 51 or 52 wherein the paint-stripping composition comprises from about 25% to about 50% by weight of benzyl alcohol and from about 5 to about 50% of (B).

54. The method of any of claims 51 to 53 wherein the paint-stripping composition comprises at least 40% by weight of water.

55. A method of stripping paint from a surface which comprises

(I) contacting the paint with a paint-stripper composition which comprises

(A) from about 0.1 to about 90% by weight of at least one alkoxy benzene or alkoxy naphthalene containing

from 1 to about 4 carbon atoms in the alkoxy groups;

(B) from about 10% to about 80% by weight of at least one organic solvent selected from benzyl alcohol alkyl-substituted benzyl alcohols, furfuryl alcohol, alkyl substituted furfuryl alcohols, and acetylenic alcohols containing from 3 to about 5 carbon atoms;

(C) from about 0.1 to about 10% by weight of a pyrrole;

(D) from about 0.05% to about 5% by weight of at least one inorganic clay thickener;

(E) from about 0.05% to about 5% by weight of at least one organic thickener; and

(F) up to about 89.7% by weight of water; and

(II) removing said paint and paint-stripper from said surface.

56. The method of claim 55 wherein the organic solvent (B) is benzyl alcohol or an alkyl-substituted benzyl alcohol.

57. The method of claim 55 or 56 wherein (A) is an alkoxy benzene.

58. The method of claim 55 or 56 wherein (A) is anisole.

59. The method of any of claims 55 to 58 comprising from about 1 to about 50% by weight of an alkoxy benzene.

60. The method of any of claims 55 to 59 wherein the paint-stripping composition also contains at least one alkalinity agent.

61. The method of any of claims 55 to 60 wherein the paint-stripping composition also contains at least one acid.

(19)



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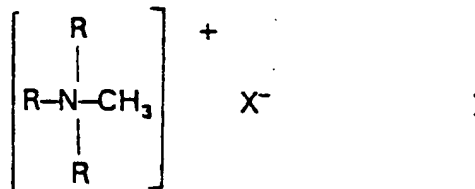
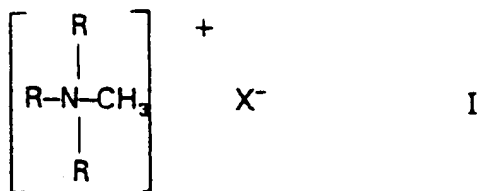
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## (54) Paint stripper compositions

(57) A paint-stripper composition is described which comprises a mixture of water and at least one organic solvent selected from (A-1) alkoxy benzenes or alkoxy naphthalenes or (A-2) at least one quaternary amine salt of the formula



wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2); and

wherein each R is independently an aliphatic group containing an average of about 6 to about 12 carbon atoms, and X is a halogen or (A-3) a mixture of (A-1) and (A-2). A method of stripping paint from a surface also is described, and the method comprises

(II) removing said paint and paint stripper composition from said surface.

(I) contacting the paint with a paint-stripping composition comprising a mixture of at least about 3% by weight of water and at least one organic solvent selected from (A-1) alkoxy benzenes and alkoxy naphthalenes, or (A-2) at least one quaternary amine salt of the formula

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# EUROPEAN SEARCH REPORT

Application Number  
EP 98 11 7918

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
P,X	EP 0 860 480 A (ELF ATOCHEM NORTH AMERICA INC.) 26 August 1998 * claims; examples 5-7 *	1-8,10, 12,49-52	C09D9/00
P,X	EP 0 810 273 A (ELF ATOCHEM S.A.) 3 December 1997 * whole document *	1-3	
A,D	US 5 411 678 A (JOHNNY O. SIM) 2 May 1995  * column 4, line 38 - column 5, line 50 *	7,8,13, 14,16, 19,20,51	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			C09D
<p>The present search report has been drawn up for all claims</p>			
Place of search		Date of completion of the search	Examiner
THE HAGUE		26 April 1999	Girard, Y
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone  Y : particularly relevant if combined with another document of the same category  A : technological background  O : non-written disclosure  P : intermediate document</p> <p>T : theory or principle underlying the invention  E : earlier patent document, but published on, or after the filing date  D : document cited in the application  L : document cited for other reasons  &amp; : member of the same patent family, corresponding document</p>			

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### CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

### LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

1-42, 49-61



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LACK OF UNITY OF INVENTION  
SHEET B

Application Number  
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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-42, 49-61

Aqueous paint-stripping compsn comprising a mixture of at least 3 % wt water and at least one organic solvent selected from alkoxy benzenes and alkoxy naphtalenes; Method of stripping paint with the aid of said composition.

2. Claims: 43-48

Aqueous paint-stripping compsn comprising a mixture of at least 3 % wt water and at least one organic solvent selected from quaternary amine salts of formula I; Method of stripping paint with said composition.

# ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 98 11 7918

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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26-04-1999

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For more details about this annex see Official Journal of the European Patent Office, No. 12/82